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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Shusaku Shibasaki	
Appln. No.	:	10/521,539	
Filed	:	January 14, 2005	Group Art Unit: 3654
Title	:	CONICAL SPRING BUFFER FOR AN ELEVATOR	Examiner: Eric E. Pico
Docket No.	:	OT-5055	

BRIEF FOR APPELLANT

Mail Stop Appeal Brief - Patents
Commissioner For Patents
P.O. Box 1450
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This is an appeal from an Office Action dated January 18, 2007, in which claims 1-10 were finally rejected.

Real Party in Interest

The real party in interest is Otis Elevator Company of 10 Farm Springs Road, Farmington, CT, 06032, who is the owner of the entire right, title, and interest in the application.

Related Appeals and Interferences

There are no known related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of the Claims

I. Total number of claims in the application

A. Claims in the application are: 1-10.

II. Status of all of the claims

A.	Claims canceled:	none
B.	Claims withdrawn but not canceled:	none
C.	Claims pending:	1-10
D.	Claims allowed:	none
E.	Claims rejected:	1-10

III. Claims on appeal

A.	The claims on appeal are:	1-10.

Status of Amendments

A first After-Final response was filed on March 19, 2007 in response to the Final Office Action dated January 18, 2007 in which claims 1-10 were finally rejected. In the first After-Final response, no amendments were made. Following an Advisory Action dated March 29, 2007, both a Pre-Appeal Brief Request For Review and a second After-Final response were filed concurrently on April 18, 2007. In a courteous attempt to reduce the number of issues pending for appeal, the second After-Final response amended claims 4 and 8-10 to render the objections to the drawings and the rejection of claims 4 and 8-10 under 35 U.S.C. § 112 moot.

A Notice of Panel Decision from Pre-Appeal Brief Review was mailed May 8, 2007. The Notice indicated that the request was improper and that a conference would not be held because a proposed amendment was included with the Pre-Appeal Brief request. Correspondingly, the second After-Final response was not entered. Further, the Examiner

confirmed in a teleconference on May 30, 2007 that the second After-Final response would not be entered, as this application is on appeal.

Summary of Claimed Subject Matter

The present invention is a buffer 26, 28 (independent claim 1) for an elevator system. As shown in FIG. 1, an elevator car 12 is suspended by ropes 14 running between the car 12 and a vertically suspended counterweight 16. Ropes 14 pass over a traction sheave 18 which is located in a machine room 20 at the upper end of hoistway 10.

FIG. 1 shows buffers 26 and 28 located in a pit 24 at the lower end of a hoistway 10. Buffer 26 absorbs the momentum of the descending car 12 in the event of an overrun. Similarly, buffer 28 absorbs momentum of the descending counterweight 16 in the case of an overrun.

The buffer 26, 28 of the present invention is shown in more detail in FIGS. 2, 3A and 3B. The buffer includes a conical coil spring 32, as shown in FIG. 2. Conical coil spring 32 includes a spiral coil element that comprises a series of coils. As also shown in FIG. 2, the inner radius R_i and the outer radius R_o of the spiral coil element both decrease along an axis 40 of the conical coil spring 32, such that if the spiral coil spring is fully compressed (as shown in FIG. 3B) the coils of the spiral coil spring are configured to be arranged in a substantially planar configuration. As shown in FIG. 2, the thickness of coil element 32 (diameter d) is substantially uniform between the outermost coil at the bottom and the innermost coil at the top. The thickness of coil element 32 varies only at the bottom portion of coil element 32 with flattened surface 38 and the top portion with flattened surface 36.

Grounds of Rejection to be Reviewed on Appeal

1. Whether claims 1-3, 5, 6, and 8-10 are unpatentable under 35 U.S.C. § 103(a) as being obvious based upon U.S. Patent No. 568,345 ("Gilpin") in view of U.S. Patent No. 380,651 ("Fowler").

2. Whether claim 4 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Gilpin in view of Fowler and U.S. Patent No. 190,291 ("Davis").

3. Whether claim 7 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Gilpin in view of Fowler and U.S. Patent No. 3,768,596 ("Solymos").

4. Whether the drawings are objectionable as failing to show features of claims 4 and 8-10.

5. Whether claim 4 is unsupported by the specification under 35 U.S.C. § 112, ¶ 1.

6. Whether claims 8-10 are indefinite under 35 U.S.C. § 112, ¶ 2.

Argument

1. <u>The Rejections of Claims 1-10 under 35 U.S.C. § 103(a)</u>

In the Final Office Action mailed on January 18, 2007, claims 1-3, 5, 6, and 8-10 were rejected under 35 U.S.C. § 103(a) based upon Gilpin in view of Fowler; claim 4 was rejected under 35 U.S.C. § 103(a) over Gilpin in view of Fowler and further in view of Davis; and claim 7 was rejected under 35 U.S.C. § 103(a) over Gilpin in view of Fowler and further in view of Solymos.

The present invention relates to the use of a spring buffer placed at the extreme limit of travel of an elevator car or counterweight to cushion the elevator car or

counterweight should the car or counterweight travel beyond its normal range. As noted in the Background section of the application, these buffers have typically been made of helical springs or hydraulic dampers, which are disposed in the elevator pit at the lower end of the hoistway.

The present invention is an improved buffer that provides a sufficiently long stroke between the uncompressed and fully compressed states to decelerate the elevator car or counterweight at the required rate, while reducing the overall buffer uncompressed height (¶¶ [0005], [0018]). The uncompressed height of the spring buffer is an important factor, because the spring buffer is located in the hoistway pit. The uncompressed height will affect the pit depth that is required, and therefore will affect the cost of the elevator system.

The spring buffer of the present invention is best shown in FIG. 2 of the application. The buffer is a conical coil spring that includes a spiral coil element having a series of coils, where the radius of the spring coil element decreases along the axis of the coil element. The outermost (lowermost) coil section has the largest radius, while the innermost (uppermost) coil section has the smallest radius. When the spiral coil is fully compressed, the coils of the spiral coil spring nest within one another to a substantially planar configuration, as illustrated in FIG. 3B.

As also can be seen in FIG. 2, the outermost coil has its bottom surface 38 flattened, so that the outermost coil tapers (gets progressively thicker) in the direction from the right side to the left side of FIG. 2. Similarly, the innermost coil also is tapered so that it has a flat top surface 36.

Between the innermost coil and the outermost coil, each of the coil sections has substantially the same diameter or thickness "d". This substantial uniformity in thickness

provides greater a stiffness or spring constant to the buffer than would be achieved if the coil sections had a thickness that became progressively smaller as the radius of the coils became smaller (as illustrated in Fowler).

Claim 1 reads as follows (italic emphasis added):

> 1. A buffer for an elevator system, the buffer comprising:
> a conical coil spring,
> wherein the buffer is configured to be disposed at one end of a hoistway of the elevator system for contacting a vertically moving member of said elevator system in the event of an abnormal overrun,
> wherein the conical coil spring includes a spiral coil element that comprises a series of coils,
> *wherein a radius of the spiral coil element decreases along an axis of the conical coil spring such that if the spiral coil spring is fully compressed, the coils of the spiral coil spring are configured to be arranged in a substantially planar configuration, and*
> *wherein a thickness of the coil element is substantially uniform between an outermost coil and an innermost coil.*

The buffer defined in claim 1 is not taught or suggested by Gilpin, Fowler, Davis, or Solymos, or any combination of those references.

Gilpin shows a safety cushion or buffer for an elevator. Gilpin shows a structure that includes an airbag B, a bottom platform C on top of airbag B, inner three auxiliary platforms C', and a top platform C^2. Between each pair of platforms, a layer of coiled springs D or D' are shown. A total of four layers of coil springs are shown in Gilpin.

As noted in the Background section of the present application, buffers for elevators are known. The present invention defines a buffer using a conical spring of a design that provides the desired deceleration of the elevator car, while providing a substantially reduced overall uncompressed height of the buffer.

Gilpin, with its airbag, five platforms, and four layers of coil springs, is definitely not concerned with minimizing the uncompressed height or the compressed height

of the buffer, and thus reducing the required pit depth. As acknowledged in the Office Action, Gilpin is silent (a) "concerning the spiral coil spring being fully compressed, the coils of the spiral coil spring are configured to be arranged in a substantially planar configuration" and; (b) regarding "a thickness of the coil element is substantially uniform between an outermost and an innermost coil." See Office Action at page 5.

The Office Action relies on Fowler to supply the teaching missing in Gilpin. Fowler describes a coiled spring in which the diameter of the spring wire decreases continuously from the outermost coil segment to the innermost coil segment. This can be seen in both FIGS. 1 and 2 of Fowler. Fowler specifically teaches diminishing the diameter of the wire forming the spring from the larger end B to the smaller end A. Fowler states that drawing the steel of the wire down to a flat taper or wedge shape is an essential feature of Fowler's invention (lines 72-97), and the single claim of Fowler requires that the cylindrical rod decrease in diameter toward the apex of the spring.

Fowler is directed to coil spring in general, and does not mention elevators as an application. There is no suggestion found in Gilpin or Fowler to substitute the spring of Fowler for the springs of Gilpin, and then modify the Fowler spring, contrary to the teaching of Fowler, so that the coil segments between the outermost coil and the innermost coil have a substantially uniform thickness or diameter. The benefit of the present invention, to reduce the uncompressed height of an elevator buffer, is not found in either Gilpin or Fowler. If anything, Gilpin teaches away from the desirability of a minimum compressed height for a buffer by its use of an airbag together with four layers of coil springs.

When applying Fowler to cure the second of the aforementioned deficiencies of Gilpin, the Office Action stated: "while the preferred embodiment of Fowler et al. does

show a non-uniform thickness between the outermost coil and an innermost coil, a statement indicating the desirability having a [non]-uniform thickness between the outermost coil and an innermost coil in no way criticizes, discredits, or otherwise discourages the solution of having a uniform thickness between the outermost coil and an innermost coil." *See* Office Action at p. 5. Even assuming, *arguendo*, that this statement is correct, Fowler must be considered as a whole, including any provisions in it that teach away from its combination with a primary reference (in this case Gilpin). *See* M.P.E.P. §§ 2141(II)(b), 2141.02(VI).

In this case, to combine Fowler with Gilpin would require ignoring the explicit teachings in Fowler that teach away from using a uniform thickness. Specifically, the point of Fowler's invention is to achieve a spring that has a "superior" action in terms of ease and smoothness (*see* lines 53-56). Fowler achieves this "superior" action by varying both the thickness of the coil and the spacing between successive coils. Accordingly, if one were to ignore the non-uniform thickness teachings in Fowler and instead were to apply a uniform thickness to Fowler's coil, Fowler's device would be unsatisfactory for its intended purpose. As stated in M.P.E.P. § 2141.03(V): "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." As a combination of Gilpin and Fowler would render Fowler unsatisfactory for its intended purpose and/or would require ignoring Fowler's teachings regarding the importance of a non-uniform thickness to achieve a "superior" spring action, Gilpin and Fowler cannot be properly combined under 35 U.S.C. § 103(a) to render claim 1 obvious. The present invention, as defined in independent claim 1, and dependent claims 2, 3, 5, 6, and 8-10 is neither taught nor suggested by Gilpin and Fowler.

Neither Davis nor Solymos provides the teaching that is missing from Gilpin and Fowler. Davis shows a cylindrical helical spring, which will not collapse to a substantially flat configuration. Thus, Davis does not achieve any of the objectives of the present invention. Solymos shows an elevator system with buffers 21 and 23 for the elevator car 1 and counterweight 7, respectively. It does not, however, provide any detail as to the structure of buffers 21 and 23.

In conclusion, the rejections of claims 1-10 under 35 U.S.C. § 103(a) should be reversed. The present invention as defined in claims 1-10 is neither taught nor suggested by Gilpin, Fowler, Davis, Solymos, or any combination of those four references.

2. Objections to the Drawings

The Examiner objected to the drawings due to an alleged failure to show: (a) a cross-section of the coil being arcuate, as recited in claim 4; (b) a thickness of the innermost coil radially varying, as recited in claims 8 and 10; and (c) a thickness of the outermost coil radially varying, as recited in claim 9. For at least the following reasons, Applicant respectfully requests a reversal of each of these objections.

As shown in FIG. 2, the conical spring buffer is shown to have a generally circular cross-section, as indicated by the dashed lines by reference character "d". Moreover, as a circular cross-section is an arcuate cross-section, the subject matter recited in claim 4 is shown in the drawings. Accordingly, the objection to claim 4 should be reversed.

As shown in FIG. 2, the uppermost coil, which is the innermost coil, has a thickness that ranges from a generally pointed tip (at the flat surface 36 on the right side of FIG. 2) to the common thickness "d" (at the left side of FIG. 2) of the coils between the innermost and outermost coils. As the thickness of the innermost coil is shown in FIG. 2 to

vary, the subject matter recited in claims 8 and 10 is shown in the drawings. Accordingly, the objection to claims 8 and 10 should be reversed.

As shown in FIG. 2, the lowermost coil, which is the outermost coil, has a thickness that ranges from the common thickness "d" (at the left side of FIG. 2) of the coils between the innermost and outermost coils to a thinner thickness at the flat surface 38 (at the right side of FIG. 2). As the thickness of the outermost coil is shown in FIG. 2 to vary, the subject matter recited in claim 9 is shown in the drawings. Accordingly, the objection to claim 9 should be reversed.

3. Rejections of claims 4 and 8-10 under 35 U.S.C. § 112

a. Rejection of Claim 4

The Examiner rejected claim 4 under 35 U.S.C. § 112, ¶ 1 as allegedly being unsupported by the specification. The Examiner asserted that ¶¶ [0009] and [0025] do "not describe a cross section of the coil element being arcuate [as] claimed in claim 4." Regardless of what ¶¶ [0009] and [0025] teach, the arcuate cross-section recited in claim 4 is taught in FIG. 2 in such a way as to reasonably convey to one skilled in the elevator art that the inventor, at the time the application was filed, had possession of the claimed invention. Accordingly, the rejection of claim 4 under 35 U.S.C. § 112 should be reversed.

b. Claims 8-10

The Examiner rejected claims 8-10 under 35 U.S.C. § 112 ¶ 2 as allegedly being indefinite. The Examiner stated that "it is unclear and indefinite wherein the innermost or the outermost coil can radially vary when independent claim 1 claims a thickness of the coil element is substantially uniform between an outermost and an innermost coil." In response to the Examiner's objection it is respectfully noted that: (a) claim 1 recites that "a

thickness of the [whole] *coil element* is substantially uniform *between* an outermost coil and an innermost coil" and (b) claims 8-10 recite that a "thickness of the *innermost/outermost coil* [*i.e.,* the individual coils themselves] radially varies." Support for these recitations is shown in FIG. 2, which shows (as recited in claim 1) that at all points, *between* (*i.e.,* not including) the innermost and outermost coils, the thickness of the coil element is a substantially uniform "d". Moreover, as the ends of the coil element taper, so as to enable the coil element to be flattened into the configuration shown in FIG. 3B, it would have been incorrect to recite that the thickness of the entire coil element is "completely" or "entirely" uniform. Accordingly, the recitation that the thickness of the coil element is "substantially uniform" in claim 1 is both accurate and fully supported by the specification. Further, the recitations in claims 8-10 that the thickness at the individual innermost and outermost coils (as opposed to the entire coil element itself) radially varies is consistent with the recitation in claim 1 that the thickness of the entire coil element (as opposed to individual coils thereof) *between* the innermost and outermost coils is "substantially uniform".

With respect to the Examiner's separate assertion that the term "substantially" itself is indefinite, Applicant respectfully notes that M.P.E.P. § 2173.05(b)(D) teaches that the term "substantially" can indeed be definite. Moreover, to the extent that the Examiner was asserting that the "specification does not provide a standard for ascertaining the requisite degree," Applicant respectfully notes that one of ordinary skill in the art would readily be able to determine the requisite degree based on that which is clearly shown in FIG. 2. Accordingly, as claims 8-10 are consistent with claim 1 and as the subject matter recited in claims 8-10 is sufficiently definite, the rejection of claims 8-10 under 35 U.S.C. § 112 should be reversed.

Conclusion

In view of the foregoing, it is respectfully requested that the appeal of the rejections of claims 1-10 and of the objections to the drawings be granted, and that pending claims 1-10 of this application be allowed.

Respectfully submitted,

June 14, 2007
Date:_____

By:_____
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Claims Appendix

1. A buffer for an elevator system, the buffer comprising:

a conical coil spring,

wherein the buffer is configured to be disposed at one end of a hoistway of the elevator system for contacting a vertically moving member of said elevator system in the event of an abnormal overrun,

wherein the conical coil spring includes a spiral coil element that comprises a series of coils,

wherein a radius of the spiral coil element decreases alon an axis of the conical coil spring such that if the spiral coil spring is fully compressed, the coils of the spiral coil spring are configured to be arranged in a substantially planar configuration, and

wherein a thickness of the coil element is substantially uniform between an outermost coil and an innermost coil.

2. The buffer as recited in claim 1, wherein an outer radius of a coil is less than an inner radius of an adjacent coil, thereby permitting said coils to be compressed axially without experiencing radial interference.

3. The buffer as recited in claim 2, wherein a cross-section of the coil element is circular.

4. The buffer as recited in claim 2, wherein a cross-section of the coil element is arcuate.

5. The buffer as recited in claim 2, wherein a transverse coil pitch of the coil element is constant.

6. The buffer as recited in claim 1, wherein the vertically moving element is an elevator car.

7. The buffer as recited in claim 1, wherein the vertically moving element is a counterweight.

8. The buffer as recited in claim 1, wherein a thickness the innermost coil radially varies so as to create a substantially flat contact surface.

9. The buffer as recited in claim 1, wherein a thickness the outermost coil radially varies so as to create a substantially flat contact surface.

10. The buffer as recited in claim 9, wherein a thickness the innermost coil radially varies so as to create a substantially flat contact surface.

Evidence Appendix

1. Evidence entered by the Examiner and relied upon by the Appellant:
None.

2. Evidence relied upon by the Examiner as to grounds of rejection to be reviewed on appeal:
Gilpin et al., U.S. Patent No. 568,345 (entered into the record by the Examiner in the September 8, 2006 Office Action) (copy attached).
Fowler et al., U.S. Patent No. 380,651 (entered into the record by the Examiner in the September 8, 2006 Office Action) (copy attached).
Davis U.S. Patent No. 190,291 (entered into the record by the Examiner in the September 8, 2006 Office Action) (copy attached).
Solymos U.S. Patent No. 3,768,596 (entered into the record by the Examiner in the September 8, 2006 Office Action) (copy attached).

Related Proceedings Appendix

None.

Table of Authorities Appendix

1. M.P.E.P. § 2141(II)(b).
2. M.P.E.P. § 2141.02(VI).
3. M.P.E.P. § 2141.03(V).
4. M.P.E.P. § 2173.05(b)(D).

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Mary M. Krywonis
Typed or printed name

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Enclosures:

1. Brief for Appellant w/attachments (31 pages)
2. Credit Card Form PTO-2038 (1 page)